US Army Medical Research and Materiel

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Live Attenuated Venezuelan Equine Encephalitis Virus Vaccine

Features and advantages:

- **Replicated to titers which were equivalent to wild type, fully virulent VEE viruses**
- **Demonstrated complete protection in mice given a dose of 10^3 plaque forming units (PFU)**
- **Two independent recombination events must occur before organism will revert to wild type**
- **Could potentially use as diagnostic assay for tissue**

This invention is a live attenuated virus vaccine against Venezuelan equine encephalitis (VEE). The virus has been attenuated through a rearrangement of its genes. The process obviates the need to search for attenuating mutations and to analyze the stability of the attenuating and/or suppressor mutations. The vaccine is potentially suitable for human and veterinary use against all subtypes and variants of VEE.

The VEE virus is a member of a large group of mosquito-borne RNA viruses that are found throughout much of the world. The VEE virus has six serological subtypes, I – VI. Two of the subtypes, I and III, have multiple variants. Existing vaccines for VEE are derived from VEE IA/B and have been shown effective in preventing disease from VEE IA/B infection. However, the current vaccines do not adequately protect against the VEE IE variant, as disease has occurred in laboratory workers vaccinated with the VEE IA/B-derived vaccine. Also, recent unprecedented outbreaks of VEE IE in Mexican horse populations indicate a need for a VEE IE vaccine. The currently used vaccines are formalin-inactivated preparations that are poorly immunogenic, require multiple inoculations and frequent boosters, and are inadequately protective against aerosol exposure to the virus. A need exists for a human and animal vaccine that is attenuated, retains the natural antigenic structure of the native virus, and is effective against both VEE IA/B and VEE IE.

The invention could potentially be used to express antigens from other alphaviruses or foreign antigens for use as vaccines. Examples include Chikungunya, Semliki Forest, and Sindbis viruses. The invention could also be used to express various immunogenic proteins and peptides, including influenza hemagglutinin, and Lassa fever, HIV, and Ebola glycoproteins.

Patent Status

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